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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Flash Photograph

See Page 83

A SCIENCE SERVICE PUBLICATION

INVENTION

Genius Flash Not Needed

New patent law declares that it is immaterial whether invention resulted from long toil and experimentation or whether it came to inventor in a flash, it is patentable.

► IT NO longer takes a "flash of creative genius" to come up with an invention which can be patented.

President Truman has signed into law a basic revision and codification of the mass of laws having to do with patents which have been passed since the first codification in 1870.

The new law also clarifies and reverses several court decisions. One of these decisions, made in 1941 by Justice William O. Douglas, declared that an invention had to be the result of a "flash of creative genius and not merely the result of the skill of the calling," to be worthy of a patent. The new law says that it does not matter how the invention was made, it is immaterial whether it resulted from long toil and experimentation or from a flash of genius.

Another section makes it easier to prove contributory infringement of a patent. Under the new law, someone who induces infringement can be guilty of contributory infringement as well as the person who actually contributes to the infringement.

Previously the courts had said that contributory infringement was illegal but that

if a patent holder tried to go into court about it, he was misusing his patent. The new law does away with this paradoxical situation.

For the first time, it has been spelled out that the courts shall presume that a patent is valid once granted by the patent office. Previously, in some courts, the inventor had to prove that he had a right to his patent.

The law is the result of a cooperative effort of all those parts of society interested in patents. Scientists, inventors, corporations, patent lawyers and government officials got together to bring order out of what they felt was the chaos of patent law.

The first real patent law was passed in 1836, although a patent office had been set up at the behest of Thomas Jefferson in 1790. The laws were revised in 1870. Since then, new laws relating to particular cases, decisions by the courts of the land and opinions as to the meanings of the law have grown into a state of some confusion. The House Judiciary Committee, which held hearings on the new law, feels it gets the basic principles on which patents are granted codified for the first time.

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PHYSICS

Cause of "Flying Saucers"

► WATER DROPLETS in the sky too small to be seen by the naked eye could have caused the appearance of the "flying saucers" reported over Washington recently.

Radar sets will pick up echoes, making blips on the radar screens, from clouds of such water droplets. These invisible clouds will also reflect lights from the ground.

Blips from clouds of such small droplets can only be picked up by radar sets transmitting on very short wavelengths. The radar sets on which the objects were seen transmit on very short wavelengths.

Weather conditions in Washington were such that these water droplets could very well have existed at the time the sightings were made.

This would explain not only the blips on the radar scopes but also the sightings of "strange lights" at the place where radar operators saw the blips. Jet pilots sent up to investigate on some occasions saw these strange lights.

It was revealed at a press conference conducted by Maj. Gen. John A. Samford, Air Force director of intelligence, that on at least one of the three occasions when sightings were made by radar that a tem-

perature inversion existed. Temperature inversions cause reflections of objects on the ground which can be picked up both by radar and by the naked eye.

Gen. Samford revealed that more emphasis will be placed on scientific observations of the reported phenomena in the future. About 200 diffraction grids or gratings have been ordered and they will be scattered around the country. These can be used to obtain spectra and to determine exactly what kind of light it is that is emanating from something seen in the sky. Also an effort will be made to utilize Schmidt camera telescopes. These photograph with constantly charged plates almost all of the sky that can be seen from the position of the telescope.

Gen. Samford explained that, of the 1,000 to 2,000 sightings of "flying saucers" reported to the Air Force, all but 20% have been explained. He emphasized that it is lack of sufficient information about this 20% group of sightings which keeps them in the unexplained column. Man is not as well equipped to measure what he observes as he is to observe, the general pointed out.

Efforts are being made to work with

scientists, both in government and out, Gen. Samford explained. Scientists, quite properly, refuse to try to explain these phenomena when there is insufficient evidence to provide a reasonable explanation. Hence the effort to improve methods of measurement.

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RESOURCES

Report Ready on Resources for Freedom

► ANALYSIS OF the raw materials problem of the United States and its relation to the free and friendly nations of the world is contained in an outstanding report on American resources, prepared by the President's Materials Policy Commission and now available. It also contains recommendations for policies and programs to meet the situation.

It is a five-volume report bearing the title "Resources for Freedom." Volume I is on Foundations for Growth and Security. Volume II concerns the Outlook for Key Commodities. Volume III is on the Outlook for Energy. Volume IV is on the Promise of Technology, and Volume V contains Selected Reports to the Commission. All are available from the U. S. Superintendent of Documents, Government Printing Office, Washington, D. C. (See listing, SNL, July 19.)

Resources for Freedom has as its central task an examination of the adequacy of materials, chiefly industrial materials, to meet the needs of the free world in the years to come. Today, throughout the industrial world but centering inevitably in the heavily industrialized United States, the materials problem bears down with considerable severity, the report states.

The problem is not the kind of "shortage" problem, local and transient, which in the past has found its solution in price changes. It lies first in the profound shift in the basic materials of the United States. Then it is to be found in the difficulties being encountered by other high-consuming nations, primarily in Western Europe, which stem from the serious depletion of their own resources coupled with the weakening or severing of ties with their colonies.

Resources discussed include products of agriculture, forestry, fishing and the mining of metals and other minerals including petroleum and various fuels. How production can be increased is one feature in the recommendations but the conservation of resources is of even greater importance.

Chairman of the President's Materials Policy Commission, which was created in January 1951, is William S. Paley. Other members are George R. Brown, Arthur H. Bunker, Eric Hodgins and Edward S. Mason. They were aided in their work by an executive and technical staff, and had much assistance from government offices.

Science News Letter, August 9, 1952

North America has over 100 million tons of known reserves of titanium ores.

CHEMISTRY

Terramycin Structure

Two-year research reveals that molecule consists of carbon, hydrogen, nitrogen and oxygen atoms with four rings of six carbon atoms each fused into a bar.

► THE CHEMICAL structure of terramycin, one of the "Big Five" antibiotic drugs, has now been worked out. This chemical feat was achieved by scientists in the laboratories of Chas. Pfizer and Co., Brooklyn, where the drug was discovered, and Dr. Robert B. Woodward of Harvard, co-discoverer of the synthesis of quinine and of an important step in the synthesis of cortisone.

Hope of synthesizing terramycin, however, is considered slim because of its complex molecular structure, said to be one of the most complex ever found in nature and unique among known antibiotics.

But even if we must continue to depend on mold fermentation processes for the supply of this healing drug, chemists may, now that its structure is known, be able to change it a little and thus produce new medicines. Knowledge of its chemical structure may also help explain the mechanism of antibiotic action and the way in which molds build up antibiotics.

Besides Dr. Woodward of Harvard, seven Pfizer scientists took part in the two-year research leading to discovery of terramycin's chemical structure, announced in the *Journal, American Chemical Society* (July 20). The seven are: Drs. K. J. Brunings, F. A. Hochstein, C. R. Stephens, L. H. Conover, Abraham Bavley, Richard Pasternack and Peter P. Regna.

The terramycin molecule, they found, consists of carbon, hydrogen, nitrogen and oxygen atoms. Its high oxygen and nitrogen content is considered responsible for its getting along well with fluids and tissues of the living body. In body fluids it apparently acts like a tiny magnet with positive and negative poles that enable it to combine with various kinds of chemicals much as body protein substances do.

In the basic skeleton of the terramycin molecule are four rings of six carbon atoms each, fused into a bar pattern.

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CORONAGRAPH MOUNT—The polar axis shaft for one of two new coronagraph mounts is here being inspected by Dr. John S. Evans, superintendent of Harvard's Sacramento Peak Station. Demonstrating the new mount is S. Dale Phillips, engineer in charge of production of the mounts.

ASTRONOMY

Coronagraph Mounts Done

► TWIN MECHANICAL mounts for the two largest, most powerful and most accurate instruments ever devised to produce man-made eclipses of the sun have just been completed at the Westinghouse Electric plant at Sunnyvale, Calif.

The key to a coronagraph is a disk in its optical system that blacks out the sun's face, which is 500,000 times brighter than the much hotter corona, revealing its halo-like corona and fiery atmosphere. The accuracy with which the coronagraph is aimed at the sun is equivalent to striking a rolling penny 13½ miles away with a rifle bullet.

Successful completion of trials in the plant, with electronic gadgets doubling for the missing giant lens and sun, signals installation soon of completed coronagraphs atop Fremont Pass near Climax, Colo., in the Rockies and on Sacramento Peak near High Rolls, N.M. The instruments were designed by Harvard and University of Colorado scientists.

At these two high points, 600 miles apart and well above the dust and haze found at lower altitudes, astronomers will add newly-designed optical systems and other instruments to the electrically and mechanically controlled equipment assembled at Sunnyvale.

The two big eyes, designed to be aimed directly at the sun, will be used for basic solar research which will contribute to:

1. More accurate predictions of short-wave radio reception.
2. Better understanding of our own stratosphere and ionosphere.
3. Possibly, improved long-range weather forecasting.
4. Greater knowledge about the sun, what it is composed of and how its light varies.

Science News Letter, August 9, 1952

SEISMOLOGY

California Shocks Likely to Continue

► CALIFORNIA RESIDENTS within 10 or 20 miles of Tehachapi, scene of the recent devastating earthquake, may as well settle down to "ride out" aftershocks for the next two months, the U. S. Coast and Geodetic Survey reported.

Such aftershocks are expected until the stresses set up within the earth by the original quake become adjusted. Many aftershocks will go unnoticed by residents, but will record themselves on seismograph records.

One of the window-breaking aftershocks

that rumbled through Bakersfield, Calif., on July 29, was recorded by instruments in Pasadena as having the largest force since the original California quake July 21.

The first strong shock, striking the town at 12:04 a.m. PDT, showed a force of 6.5. That was merely one point lower than the original quake that registered at 7.5, the U. S. Coast and Geodetic Survey reported. A second shock following within the hour produced a seismograph reading of 5.7.

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PHOTOGRAPHY

How to Make Good Lightning Photographs

See Front Cover

► THE PHOTOGRAPH of lightning on the cover of this week's SCIENCE NEWS LETTER was taken by the Science Service staff photographer, Fremont Davis, on the night of July 22, 1952.

If you would like to take such a picture during the next night thunderstorm, set your camera up on a firm tripod and focus on infinity. Use the widest opening (the one on the cover was taken at 4.5) and a fast film.

Watch the lightning flashes for a while to see in what region of the sky they are most frequent and to get an idea of the frequency of the flashes. Then open your shutter when you think it about time for a large stroke and close it as soon as one flash has occurred.

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AERONAUTICS

Triple-Deck Airplane

New British Blackburn four-motor ship will carry eight automobiles and 42 passengers plus crew. Useful for tourists who want their cars with them.

► A NEW triple-deck British airplane for carrying automobiles and passengers, just revealed, indicates the increasingly important part that aviation is playing in transporting freight. The two lower decks of this plane will hold eight automobiles and the upper deck will accommodate 42 passengers plus the crew.

This triple-deck freight airplane, which will be ready for use early in 1953, is a version of the Blackburn four-motor Universal Freighter, now Europe's largest carrier plane. Cars will enter the plane to its lowest deck through large doors at the rear. Inside they will be raised to the middle floor by means of an elevator. While designed particularly to carry automobiles, the plane can be used to transport other vehicles or can be used for general freight.

Many types of cargo planes have for several years been in wide use and many of them can accommodate automobiles. Few, however, are for both passengers and automobiles, a handy type for tourists who want to take cars with them.

Among American cargo planes are some which are converted passenger planes or versions of former passenger planes. The Boeing Stratofreighter is a version of the civil Boeing Stratocruiser. The Consolidated-Vultee military C-99 is a version of the famous bomber, the B-36, made by the same company. The Douglas cargo Globemaster, the C-124, the biggest transport plane used by the Air Force, is an extensively modified version of the C-74 Globemaster. It has "clamshell" doors on the front end which can be opened to permit tanks and trucks to be driven into it up a special ramp.

Notable among American freighter planes is the Fairchild Packet, sometimes called the flying boxcar. It is a twin-engine aircraft, with the engines in wing housings that project well to the rear and are connected at their rear ends with a horizontal tailpiece. Wings and tailpiece are high enough in the air when the plane is on the ground to permit loaded trucks to back in under them to the giant doors on the rear of the fuselage.

A new version of the Packet is under construction. It will have a detachable cargo-carrying fuselage with its own wheels so that it may be towed along the ground. When it is detached, the working part of the craft, with pilot's cabin, wings, power and tailpiece, can jockey itself over another cargo fuselage, pick it up and fly it away.

A helicopter which can pick up and carry the same cargo fuselage is under development. The idea is that the combina-

tion will make it possible to deliver a loaded fuselage to an airport where it can be picked up by the helicopter. It then can be carried to places occupied by troops that cannot be reached by airplane but where the small space required for a helicopter landing can easily be cleared.

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ENGINEERING

Conveyor Belt Walk Gets Scientific Data

► CONVEYOR BELT sidewalk, 85 feet long and two feet wide, has been in experimental use in Akron, Ohio, for a year to obtain scientific data which may find application in the proposed subway shuttle system between Times Square and Grand Central Station, New York City.

The type of "moving sidewalk" used, developed and installed by Goodyear Tire and Rubber Company, looks much like the moving stairs now widely used but lies flat on the earth. Like the escalator, it has a moving handrail to be grasped by the passenger. It is driven by electric motors geared for speeds from less than one mile to five miles an hour.

The fast-moving section of the moving sidewalk, 68 feet in length, has an entrance section and an exit at its ends. Passengers entering step on to the entrance belt while walking at one and a half miles per hour. Associated with the belt sidewalk were many types of instruments to record the data desired.

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HERPETOLOGY

Rattlers Avoid Men While Men Fear Snakes

► "OPERATION RATTLESNAKE" will be conducted in the oil-producing areas of California during the next few weeks by Dr. Raymond B. Cowles and Edgar Lundeen of the University of California at Los Angeles. They will:

1. Determine where and in what numbers rattlesnakes are present.
2. Develop control measures.
3. Reduce fear of snakes through an information program.

The work for the Richfield Oil Corporation will be conducted principally in Kern, Santa Barbara and Los Angeles counties where a "rattler" problem exists around oil wells, pipe lines, and storage tanks.

Fear of snakes, oil field workers not ex-

cepted, mostly is psychological, Dr. Cowles points out. If impressed upon the workers that snakes seek to avoid human beings as much as the latter seek to avoid snakes, half the problem is solved.

"The great danger is coming on to a snake before he sees you and gets out of your way," says Dr. Cowles. "Areas such as oil fields—where vegetation has largely been removed—are not nearly so dangerous as those that hunters and fishermen move in."

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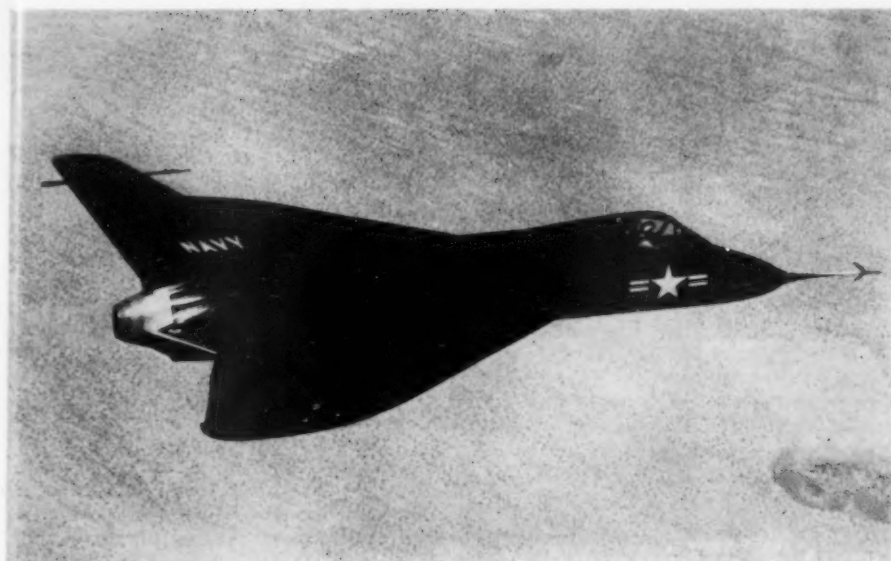
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SKYRAY—This new anti-invasion plane takes its name from its resemblance to that sea creature, the manta ray. It has a delta type wing with jet engine. It is now being flight tested.

AERONAUTICS

Anti-Invasion Airplanes

Our defense against bombers carrying atomic bombs is a plane which carries no guns, but which has electronic equipment to locate an enemy and automatically fire rockets.

► THE NEW British Gloster GA-5 is Britain's supersonic answer to enemy bombers carrying atomic bombs, while the new American Starfire and Skyray are the answer in the U. S. or elsewhere if needed. Both are in the speed-of-sound class, and both are equipped with radar and other electronic apparatus to enable them in any kind of weather to locate and kill an approaching enemy bomber.

The Starfire, designed and built by the Lockheed Aircraft Corporation and known officially as the F-94C, is an evolution of the famous Shooting Star, America's first mass-produced jet airplane. In general appearance it resembles its predecessor and other well-known straight-wing jet fighters, while the new British plane is the delta-wing type with an appearance distinctive to aircraft of this type.

Delta-wing planes, being built in both America and England, have a wing surface in the shape of a gigantic triangle with a fuselage that stretches across the triangle and to the front. The new delta-wing Skyray, the Navy's speediest anti-invasion plane, is designed for use from carrier decks. It is a product of Douglas Aircraft and will be in production soon. It is able to climb rapidly to high altitudes and maneuvers well at such heights.

The new British Gloster is powered by two Sapphire jet engines with a combined thrust of 16,600 pounds. The Starfire is powered by a single Pratt and Whitney engine with a 6,250-pound thrust but is equipped with an afterburner to give additional power for rapid take-off and extra performance in combat. Both planes are long-range, day and night all-weather fighters.

Both planes are heavily equipped with radar and with electronic controls. The radar permits the pilots to "see" enemy craft in darkness or dense clouds. The British claim is that, while armament and radar equipment are secret, the new Gloster is better qualified than any other plane in the world to destroy atom bombers.

Electronic innovations in the Starfire include the new Westinghouse automatic pilot and the Sperry Zero Reader Flight director. It is one of the few fighter planes equipped with ILS (Instrument Landing System) for low-visibility landings in darkness or bad weather.

The Starfire carries no guns. Instead, it is armed with 24 air-to-air rockets, the 2.75-inch size, housed in a ring of firing tubes around the nose of the plane. It can carry additional rockets in new-type pods on the wings.

This American answer to invading enemy bombers is one of the fastest-climbing jet airplanes in ascending to bomber invasion lanes at 40,000 to 50,000 feet altitudes. It is maneuvered with the help of ground radar to the general target area, when its own radar takes over. The pilot then keeps the "pip" of the enemy plane centered on his radar screen. When the pip reaches a certain size on the screen, indicating its nearness, the pilot presses a trigger and the electronic equipment takes over to discharge automatically rockets at the proper time.

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MEDICINE

Epilepsy Drug May Cause Blood Disease

► A WARNING that apparently all the newer drugs for epilepsy can dangerously depress the blood-forming action of the bone marrow appears in the *Journal, American Medical Association* (Aug. 2).

The warning comes in a report, by Drs. Allen E. Hussar and Helen B. Rogers of the Veterans Administration Hospital, Tuscaloosa, Ala., of the first known direct evidence of such bone marrow damage from phethenylate, also known as "thiantoin." The patient developed the blood disease, agranulocytosis, but recovered when the drug was stopped.

Frequent blood cell counts should be made, the VA doctors advise, when any of the newer epilepsy drugs is used.

Only one which apparently does not interfere with blood cell formation in the bone marrow is the oldest of the group, diphenylhydantoin sodium, known also as Dilantin sodium.

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MEDICINE

Poisoning Case From Chlordane Fumes

► A CASE of poisoning from chlordane fumes, believed the first on record for this particular insecticide, is reported by Dr. G. Bruce Lemmon, Jr., of Springfield, Mo., and Comdr. Wilmot F. Pierce (MC), U.S.N., in the *Journal, American Medical Association* (Aug. 2).

The patient, a 33-year-old housewife, recovered. Her exposure to too much of the insecticide came when her apartment was sprayed during the day and she did not air it out afterwards and slept with the windows closed. She awakened about 3 a.m. coughing badly and vomiting and was taken to the U. S. Naval Hospital at San Diego.

Tests showed disturbance of liver function as well as lung involvement. The patient's fatness and "definite alcoholic tendencies" could have made her more susceptible to liver damage from the chlordane fumes, Drs. Lemmon and Pierce suggest.

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PHYSICS

Study Thunderstorms

► AN EXPLANATION of some aircraft accidents while flying through thunderstorms has been found as the result of a study of thunderstorms carried out by the government.

Dr. Horace R. Byers, professor of meteorology at the University of Chicago, and a director of the thunderstorm project, pointed to the record of one flight through a thunderstorm as a clue to a cause of these accidents.

Inside the thunder cloud, the pilot encountered an updraft of about 38 feet per second. The pilot, highly experienced, instinctively put the airplane into a dive and reached a high airspeed before he corrected his mistake.

"From this," Dr. Byers says, "one sees

an explanation as to why even experienced pilots get into grave difficulties in thunderstorms. Strong drafts have strong gusts in them and the loads imposed upon an airplane by a gust depend upon the airspeed.

"Pilots who have discussed these results point out that the great stress on maintenance of altitude contained in the Civil Air Regulations causes a pilot to react against altitude changes in drafts. In the case of this and other flights of the Thunderstorm Project, such a procedure might prove disastrous if completely carried out."

Dr. Byers pointed out that the opposite corrective action is taken by a pilot on a downdraft and, if this is carried too far, a stall might result.

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ENGINEERING

Car Air Conditioning

► AIR CONDITIONING will be the latest addition to extra gadgets fitted to 1953 automobiles by manufacturers, along with radio, heater, and shift-free transmission.

Now that Cadillac and Oldsmobile have announced availability of an air-conditioning unit on their next models, other manufacturers are expected not to delay too long offering their devices.

The extra cost, as yet unannounced, is expected to be about \$500. The General Motors-Frigidaire version has undergone testing and development in Texas and the Southwest where there is greatest need for air-conditioned cars.

Even when the weather is not unbearably hot, the air conditioning device is reported to be desirable in dust or high wind because the car can be driven in any temperature with the windows closed.

Basic principle of auto air conditioning is the same as in units used in offices and on railroad trains. A rotary compressor is located on the engine in the General Motors version. A sealed refrigeration unit using nontoxic Freon is mounted on a shelf in the car's trunk compartment. A single control is placed on the dash and temperature is maintained by a thermostat setting.

Automobile air conditioning, due to limitations of space and weight, calls for careful engineering.

One kind of air conditioning equipment, installed in automobiles by a Fort Worth manufacturer, has been in use for several years. This compressor unit takes its power off the rear axle. Approximately a thousand of these units were provided at about \$700 each.

Cooling equipment for automobiles has been improvised in hot areas. Cakes of ordinary ice, placed on the front floor of a car, have long been used. Dry ice, solidified carbon dioxide, became available at gas sta-

tions in the Southwest a dozen or so years ago. It is more satisfactory as a car cooler because it does not increase the humidity inside the automobile.

An attachable cooler, somewhat similar to types widely used in low-humidity regions, is not uncommon in the Southwest. It is fitted into the front window on the right side of the car. Open to the front, it scoops in air as the car is driven. This air is cooled on its way into the car itself by passing through wet excelsior or a loosely woven fabric. The necessity of frequent replenishment of water to keep the fabric wet is one of its disadvantages.

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BIOCHEMISTRY

Sodium Ion Key In Nerve Impulse

► THE SODIUM ion, which you get in table salt, may be a key factor in the conduction of nerve impulses, it is suggested in new evidence uncovered by Dr. Frederick Crescitelli at the University of California at Los Angeles.

He reports two developments that underline the importance of sodium in nerve conduction.

(1) In one experiment it was shown that nerves in contact with solutions lacking sodium chloride, or salt, lost excitability and the ability to conduct impulses in a matter of minutes. Rapid recovery took place when these nerves were treated with another sodium solution.

(2) Another experiment involved the use of carbamates, nerve-blocking drugs. It was found that the nerve block brought on by the drug was quickly removed and conduction restored by an increase in sodium. This would seem to indicate that a sodium

mechanism acts as a key link in the nerve impulses, the zoologist said.

Dr. Crescitelli's studies were done with frog nerves, but have important implications in the functioning of human nerves. "Such experiments, while momentarily obscure to the layman, when added to other information, may some day furnish a complete picture of the functioning of the nervous system," he said.

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ENGINEERING

May Cut Housing Costs By Proper Roof Design

► THE QUESTION of snow on the roof is not worrying many Americans at this time of the year but roof load requirements are important to the builder at all times and the most important load is ordinarily the snow of the winter months. Valuable information for builders and architects on probable snow loads is now available in a government publication.

It is contained in Housing Research, a publication of the U. S. Housing and Home Finance Agency. It is in Housing Research Paper No. 19, which can be obtained from the Superintendent of Documents, Washington, D. C., for 30 cents. The article is based on research by the U. S. Weather Bureau, made under the sponsorship of the Housing Agency.

A study of snowfalls in different parts of the country for the past 50 years was made by the Weather Bureau to obtain data showing the possible maximum snow load roofs would be called upon to support.

Application of the information will permit a reduction in present building code requirements in many localities and eventually should result in lower building costs. Some southern cities now have snow-load requirements greater than many northern areas. Even in the north, requirements vary as much as 20 pounds per square foot.

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MEDICINE

Sunburn Rule: Double Faint-Pink Time

► A TIME schedule sun bathers can follow to avoid painful burns and blisters has been worked out by Dr. Lewis R. Koller of General Electric Research Laboratory. Here it is.

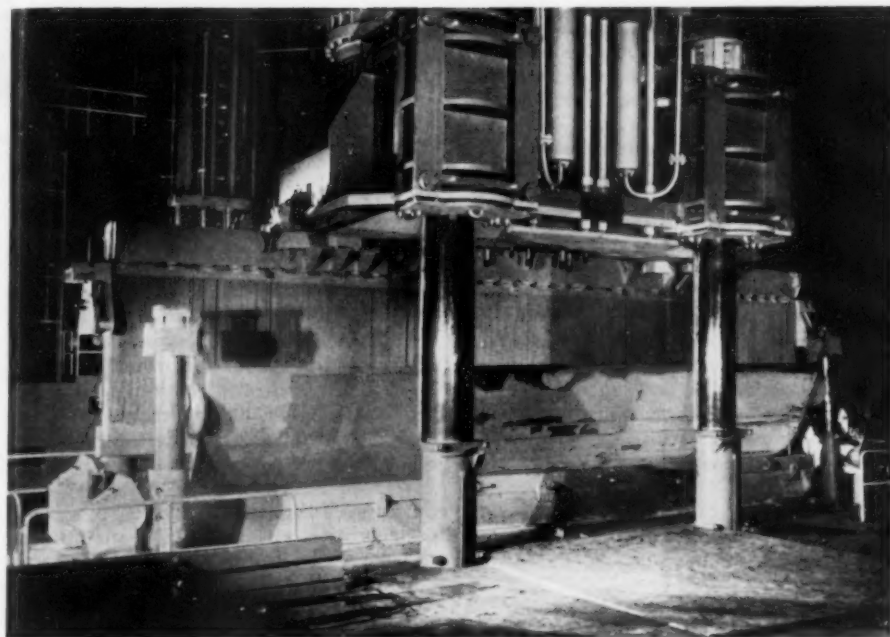
First, note the time it takes for the summer sun to make your skin a faint pink. Then limit your sun bathing to two or three times that period.

Five times that period can give you a painful burn and 10 times the pink-tinting period will result in blisters.

Science News Letter, August 9, 1952

The African peacock is the only true pheasant in Africa.

Chiggers are most often found in low, damp places well covered with vegetation.



HUGE PRESS—This tremendous press is banging heavy steel plate into a boiler drum section at the Barberton, Ohio, plant of the Babcock and Wilcox Co.

ENGINEERING

Giant Forge Press

► A GIANT forge press about six and a half stories tall is thumping out huge steam boilers from red-hot 50-ton sheet steel six inches thick. This is the heaviest plate ever rolled.

Designed, built and installed at the Babcock & Wilcox Company's Barberton, Ohio, plant, the big press can handle sheet steel 42 feet long. The press bends the steel slightly with successive thumps into a half-shell. When two such half shells are welded to form the boiler drum, the resulting cylinder's diameter is accurate to 1/16 of an inch.

Improved steam-driven generators require higher steam pressures to operate efficiently. That in turn means that bigger and better boilers are needed. And that means new machinery must be created to turn out economically the more-expensive parts.

By handling such large pieces of steel, the press not only increases production but also reduces welding costs. Only two welds are necessary to join the two half-shells into a boiler drum 42 feet long. Formerly, a boiler shell 40 feet long was made of 10-foot sections requiring three welds running all the way around the drum in addition to the usual welds joining the half-shells.

After the welds have been made, the drum is taken to a special room where it is given an inspection by a 2,000,000-volt X-ray machine. Flaws spotted on the X-ray film are chiseled out and the weld is repaired.

The glowing 100,000-pound sheets of

steel are handled under the press by means of pushbutton controls almost as easily as records are handled by automatic phonographs.

A specially built overhead crane carries the plate, as it is called, from the gas-fired furnace to the press. Four hydraulically operated arms with grapple hooks manipulate the plate under the powerful jaw of the press.

Strong-muscled workmen work within inches of the plate. They are clad in lightweight garments that look like aluminum-surfaced cloth raincoats. The garments reflect heat from the plate that may be at a temperature of nearly 2,000 degrees Fahrenheit.

In addition to beating out boilers for future power plants, the press combines with another piece of equipment, a draw press, to form hollow forgings, pieces of pipe needed for specialized jobs in power plants.

The crane carries a fiery ingot of steel from the furnace and sets it down in a pit built into a moving section of floor. The pit crawls under the press and, with a muffled rumble, a big finger-like mandrel punches a hole lengthwise through part of the ingot.

The ingot is transferred to a draw bench that has another finger-like mandrel. The draw bench, operated by a powerful hydro-pneumatic pressure system, forces the hot metal through dies which make the forging thinner and longer. The result is a rough pipe with one closed end that can be left closed or that can be opened.

Although the process is not new, the press-draw bench combination can handle sizes of forgings never before attained in this country, B&W officials explained. The draw bench will produce rough hollow seamless forgings up to 35 inches in outside diameter with walls four and a half inches thick. Only a few minutes are consumed from furnace to dirt pit where the forgings are set down to cool.

Science News Letter, August 9, 1952

ENGINEERING

Tougher Grass on Ball Fields to Stop Puddles

► HOW TO lick standing puddles and worn-out turf on football fields is what Walter W. Weir, drainage engineer of the University of California College of Agriculture, Berkeley, is trying to find out.

Last year Mr. Weir first took samples of the soil on the University of California Memorial Stadium football field and found it so compacted that only one-half inch of water penetrated in six days.

The field was disked and new top soil added, thus raising the crown of the field four inches. After seeding, equipment was run over the field during the summer to puncture the upper four inches of soil and increase air and water penetration.

During last season the problem of standing water was practically non-existent. The rough wear and tear of football cleats, however, still tore up the turf in the middle area of the field. Mr. Weir advised that a new strain of Bermuda grass be used in the stadium. This new grass strain is not only tougher, but has less tendency to turn brown in the late fall and winter.

The newly-planted grass is expected to carpet the field by kick-off time this fall.

Science News Letter, August 9, 1952

STATISTICS

Catastrophe Deaths Up, Due to Tornadoes

► TORNADOES AND fires in homes helped bring the catastrophe death toll for the first six months of this year up 25% above the figure for the same period in 1951.

Catastrophes are accidents killing five or more people, Metropolitan Life Insurance Company statisticians explain. They report that tornadoes accounted for 229 deaths in the first six months of this year.

Plane and railroad crashes, on the other hand, killed fewer people the first six months of the year than during the same period last year.

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Mango seeds, normally thrown away as waste, are suitable as subsidiary feed for cattle.

High altitude winds, called "jet streams," have been reported moving at speeds as high as 357 miles per hour.

ASTRONOMY

Star Flares Up in Constellation Scutum

► ANOTHER "EXPLODING star" or nova has blazed forth in the heavens. It is in the constellation of Scutum, the shield, to be found in the south these summer evenings. But even with its new brilliance, the star is too faint to be seen without a telescope.

The nova was found on Saturday, July 19, by S. Arend, of the Royal Observatory of Uccle, Belgium, famous for having discovered two new comets last year. News of the "new star," of the 11th magnitude, was received by Harvard College Observatory, clearing house for astronomical news in the western hemisphere.

Science News Letter, August 9, 1952

MEDICINE

To Avoid "TV Neck" Adjust Screen Height

► PHYSICIANS WILL be seeing more and more patients with a condition called "television neck," Dr. William Kaufman of Bridgeport, Conn., warns.

From his description of the condition, *Journal, American Medical Association* (Aug. 2) it appears to be a kind of painful, stiff neck which comes from straining head and neck down and forward to see the television screen. Husbands and wives are likely to get it on opposite sides.

To avoid the condition, Dr. Kaufman says, raise the TV set or lower the chair or make whatever adjustments are necessary to give proper posture for relaxed viewing.

Science News Letter, August 9, 1952

PSYCHOLOGY

Teach Deaf Child With Other Deaf Children

► THE BELIEF that a deaf child is just like the normal child except that he can't hear is wrong, and it is an injustice to the deaf child to believe it, Dr. Helmer Myklebust, professor of audiology and director of the children's hearing and aphasia clinic in the school of speech at Northwestern University, said in Milwaukee, Wis.

Speaking before a group of parents of deaf children at Wisconsin State College, Dr. Myklebust explained that deaf children do not have the same experiences as normal children, and consequently do not think as normal children do.

"Hearing is one of the primary senses," he said. "We can hear in all directions at the same time. We can hear in the dark. We can hear around corners. We hear even when we're asleep. Hearing is a vital factor in most of our perceptions, in telling us what is going on around us. The deaf person does not have these perceptions, so his world is different."

Because of this difference, Dr. Myklebust said he did not believe it wise to enroll deaf children in schools with normal children. The normal children, he explained, usually reject deaf classmates from their social activities, thereby adding to the sense of isolation the deaf child already has.

It is better for a deaf child to be with other deaf children and to be taught by a teacher who understands their problem, Dr. Myklebust said. He warned, however, that a deaf child should have some contact with normal children.

"And don't expect your neighbors to understand your child's problem," Dr. Myklebust added. "Society generally doesn't understand because there aren't enough deaf people in it."

Science News Letter, August 9, 1952

INVENTION

Device Warns Pilots of Stall

► A DEVICE to indicate when a plane is about to go into a stall by ionizing the air stream around the wing has received a patent.

The stall detector takes advantage of the fact that when a plane's wing is in normal position, the air flows back along the top of the wing, clinging close to the surface. When it is in a stall position, the air stream leaves the surface of the wing and, close to the wing, a state of turbulence exists.

The inventor, Paul J. Campbell, Middletown, Conn., provides a device which ionizes the air at the leading edge of the wing. Toward the rear of the wing, a detector picks up evidence of the ionized air. When the plane approaches a stall, the detector no longer can pick up the ionized air, thus indicating the approaching stall to the pilot.

Mr. Campbell assigned his invention, number 2,603,695, to the United Aircraft Corporation, East Hartford, Conn.

Science News Letter, August 9, 1952

INVENTION

Patent Trainer Aid for Night Radar Navigation

► EDWIN A. LINK, Binghamton, N. Y., of "Link Trainer" fame, has received a patent for a new trainer which helps pilots to learn to navigate by the radar set in their planes. Night fighter planes in particular use radar to find and approach enemy bombers.

A simulated oscilloscope and range meter are in the pilot's cockpit of this new trainer. On these the position and range of the "enemy bomber" are indicated. The pilot must maneuver his trainer in the proper manner to bring him in position to attack the bomber. A record of his maneuvers is made outside the trainer. Mr. Link received patent number 2,602,243 for his invention.

Science News Letter, August 9, 1952

IN SCIENCE

BIOCHEMISTRY

Tagged Chemicals Tell How Body Fights Ills

► INFECTION-FIGHTING antibodies, released into the blood stream, strike at disease-causing invaders in several ways.

Dr. Felix Haurowitz of Indiana University, Bloomington, has tagged invading foreign proteins with radioactive carbon, sulfur and iodine.

War on the cellular and molecular level consists of invasions of the disease-producing proteins into cells, which in turn produce substances that destroy the invader's chemical powers.

Science News Letter, August 9, 1952

EDUCATION

Research Programs Affect College Teaching

► RAPIDLY EXPANDING research programs in American colleges and universities are having an effect on teaching programs, it is indicated by recent action in Washington of the American Council on Education which has just appointed a nine-member committee to study the problem.

The committee will study "broad problems arising from the impact on colleges and universities of the rapidly expanding research programs sponsored by government agencies and by industry," the Council states. Most of such research is in science and engineering. The amount of research sponsored annually by the Federal government in colleges and universities may exceed \$150,000,000 this year.

Major areas for the study by the committee will cover relationships among various interested groups within individual institutions, and the principles and practices of government agencies, industrial concerns and other organizations that sponsor research.

President Virgil Hancher of the State University of Iowa is chairman of the committee. Other members are President J. R. Killian, Jr., Massachusetts Institute of Technology; Chancellor Franklin D. Murphy, University of Kansas; Vice-president T. P. Wright, Cornell University; Vice-president J. C. Morris, Tulane University; Comptroller Larry R. Lunden, University of Minnesota; Vice-president James H. Corley, University of California; Prof. Robert F. Bacher, California Institute of Technology; and Rev. James B. Macelwane, S.J., dean of the Institute of Technology of Saint Louis University.

Science News Letter, August 9, 1952

NEW FIELDS

DENTISTRY

More Saliva in Mouth, Less Decay in Teeth

► TOOTH DECAY may be affected by the amount of saliva in a person's mouth, it has been found in research by Dr. Ralph E. McDonald at the Indiana University School of Dentistry, Indianapolis.

The more saliva normally produced in a person's mouth, the less tooth decay he is likely to have, Dr. McDonald learned. Also, the more viscous the saliva, the more the chance of decay.

Apparently it is a matter of the washing effect of the saliva on teeth. The more saliva, the greater the washing effect, and the more viscous it is, the less the washing effect.

Science News Letter, August 9, 1952

INVENTION

Pocket Is Large Enough To Carry New Typewriter

► A TYPEWRITER small enough to be carried around in a pocket has been invented by Maurice Julliard, Paris, France, for patent number 2,603,336.

In order to make the typewriter small enough, the inventor has done away with the conventional roller. Instead, circular sheets of paper, placed on a revolving cylinder, meet the keys. As a key is struck, it revolves the cylinder to the position for the next letter to be typed. The inventor does not give precise measurements of his typewriter but he says it can be contained in an average sized pocket and can be used without any support, being simply held in the hand.

Science News Letter, August 9, 1952

VETERINARY MEDICINE

Chickens Fog-Sprayed To Keep Them Cool

► POULTRY SPECIALISTS are revising the old saying "madder than a wet hen"—making the 1952 version read "as comfortable as a sprayed chicken."

In experiments to keep chickens cool during hot weather, W. O. Wilson of the University of California, Davis, fog-sprays the birds. This wets the chickens and makes them "sweat." Cooling is accomplished by evaporation.

A hen's discomfort during hot weather, he points out, is due to her inability to lose the heat generated by her metabolic processes. Body temperatures of chickens are about 107 degrees Fahrenheit. The problem is to help reduce the temperature of

both the surroundings and the chicken.

In addition to fog-spraying the birds, Mr. Wilson suggests these methods of beating the hot weather:

1. Give your birds plenty of cool water. A hen, for example, may double her intake of drinking water during a hot spell. If the water is warm, consumption falls off.
2. Give chickens plenty of shade—either in the form of open-type shelters or trees and fast-growing vines.
3. Sprinkle the roofs of poultry houses to keep them cool.

At the present time, he pointed out, it is not economically sound to use a closed poultry house and to cool the birds by means of an evaporative cooler.

Science News Letter, August 9, 1952

TECHNOLOGY

Copper-Steel Brake Drums Aid Safe Driving

► COPPER-STEEL BRAKE drums, now available for heavy trucks and buses on the highway, dissipate rapidly the heat of friction created when the brakes are applied, thus assuring faster and surer slowing down and stopping.

Designed to replace the present cast iron drums, their use is expected to decrease greatly highway accidents due to brake failure.

Iron has a tendency to hold the heat generated by friction when brakes are applied. On ordinary brake drums, high temperatures "burn" the surfaces of the lining and cast iron drums, causing excessive wear, cracking and loss of braking power. With the new brake drums, made of welded copper and steel, temperatures developed have far less adverse effect on the braking action because copper is a good conductor of heat and the heat generated is dispersed.

The drums are made by welding a copper base with a parallel series of copper fins to the outer surface of specially alloyed steel drums. As explained by the manufacturer, the Copperweld Steel Company, Glassport, Pa., the result is that heat is drawn off rapidly from the braking surface, equalized over the copper base, and then sent into the air through the fins much on the same principle as heat is dissipated from steam radiators employed in house heating.

Science News Letter, August 9, 1952

VETERINARY MEDICINE

30-Day Solitary For Show Animals

► IF BOSSY goes to the fair, she will have to pay for it by 30 days in solitary. The American Veterinary Medical Association advises a minimum quarantine period for all show animals so that they will not bring disease hazards back to the farm with any ribbons they may have won.

Science News Letter, August 9, 1952

PHYSICS

New Pilot Reactor Uses "Fuel" in Form of Slurry

► THE SECOND atomic energy production of electricity will soon be a reality, it was revealed in the 12th semiannual Atomic Energy Commission report.

A pilot reactor that has its fissionable material in the form of a mud-like slurry started operation at the Oak Ridge National Laboratory April 15. A small experimental plant to produce electric power is part of the installation.

First atomic electric power production in a small way occurred when the AEC experimental breeder reactor began operation at Arco, Idaho, last year.

The new Oak Ridge homogeneous reactor is investigating the fluidized method of handling the plutonium or uranium used as "fuel".

Zirconium and hafnium metals, useful in reactor building and for other purposes, are being produced under AEC contract at \$15 a pound, the report stated.

Science News Letter, August 9, 1952

GENETICS

One-Celled Animals Tell How Body Cells Develop

► THE MYSTERY of how the countless different kinds of cells in the body, from eyebrows to toenails, develop from a single egg cell is being probed by Prof. T. M. Sonneborn and fellow geneticists at Indiana University.

They are hoping to find the answer by studying the tiny, one-celled animal, paramecium, which lives in water and multiplies simply by dividing into two identical parts. The Indiana scientists have found that contrary to previous belief this one-celled animal is not "sexless" but does have mating types which unite with opposite types.

Science News Letter, August 9, 1952

INVENTION

Spaghetti Tamer Gets New U. S. Patent

► DOES YOUR wrist get tired from twisting spaghetti onto a fork? Do you become angry when the spaghetti slips off and you have to go through the whole tiresome task again?

Well, you need no longer approach a plate of spaghetti with trepidation—only with an appetite. A revolving spaghetti fork has been invented. Philippe Piche, Valleyfield, Quebec, Canada, has provided that the shank and tines of the fork revolve independently of the handle. They are revolved by a flick of the thumb on a little wheel attached to the shank. M. Piche received patent number 2,602,996 for his invention.

Science News Letter, August 9, 1952

AERONAUTICS

America's Jet Age

The decade since first jet plane made its initial flight might be called fastest age in aviation history because of progress made.

By A. C. MONAHAN

► THE JET age in American aviation is now ten years old. The Bell Airacomet, America's first jet plane, made its initial flight on Oct. 1, 1942. The decade since then has been called the fastest 10 years in aviation history because of almost unbelievable progress in jet propulsion made in this short period.

It is a long, long step from the relatively simple Airacomet to the giant jet-bombers of today with their six or eight engines. There is little resemblance in the engines used, although they operate on the same basic principle. Design changes in fuselage and wings are as radical as the changes in the engines.

Today's jets that travel with the speed of sound are far different in appearance from the first jet, and still further removed from conventional planes powered by conventional engines. For travel at the speed of sound the body of the plane must be long and narrow, with an extremely smooth outer surface and no protuberances to create drag. Also thin-edge wings are required which can cut through the air with a minimum of resistance.

As is well known, the United States was not the pioneer in jet propulsion. England and Germany both were ahead of America. A jet-propelled British plane flew in May 1941. It was powered by a Whittle engine, designed by Sir Frank Whittle, a British scientist whose engine was ready for use in 1937. The first American jet engines, such as the two built by General Electric that powered the Bell Airacomet, were versions of this British power plant.

Much More Powerful

Jet engines of today which deliver a thrust of 5,000 to 8,000 pounds are five to six times as powerful as earlier types. They are more economical on fuel and have a longer operating life because of improved design and construction and particularly because metal alloys have been developed that withstand better the high temperatures under which jet engines operate best.

An additional help to the jet engine is the so-called after-burner through which discharge gases pass and in which additional combustion takes place to increase the thrust of the discharge. An after-burner may increase the thrust of a plane as much as 50% at times when bursts of speed are needed.

For high speeds in the transonic region and above, it is easily understood that a long sleek plane fuselage is essential, and

one without projections which increase drag. Less evident are the structural changes necessary. Planes at supersonic speeds encounter stresses not ordinarily met.

Then they must be so constructed that they can resist the heat developed by friction as they bolt through the air. Still again, they must be able to carry the necessary radar and other electronic equipment required for high speeds. Automatic flight controls are essential because at great speeds manual control by a pilot is too slow.

Greatest Change in Wing

One of the most noticeable changes in jet plane design is in the wing. The thin forward edge of the wings used is not a prominent feature to the casual observer but the sweptback wing now coming into common use on jet planes is readily spotted. Ordinary wings project out from the body of the plane approximately at right angles. Sweptback wings may project backward as much as 30 degrees from the right angle position. They are used because at high speeds they lessen drag although probably they are not as efficient at take-off as conventional wings.

Another type of airfoil coming into use both in America and England is the so-called delta wing. This lifting surface is the shape of a triangle with three equal sides. The fuselage of the plane stretches along the center of the triangle, projecting some half its length to the front. The lifting surface can be regarded as an extreme sweptback wing but it contributes several advantages to highspeed planes.

In the 49 years since the Wright brothers flew the first man-carrying heavier-than-air plane, remarkable progress in aviation has been made. But in no equal period has such progress been made as in the past ten-year jet age. The big question now is the future of jet propulsion. The speedy jet planes now in combat service in Korea have proved their worth, both as fighters and bombers. The question now is the adoption of jet engines by civilian aviation and how lessons learned in the jet development can be applied to other civil needs.

England seems to be leading the way. A British-built transport powered entirely by jet engines is now in regular service between London and South Africa. A score or more of other jetliners are under construction or order. Some of them will be improved versions of the present plane. A Canadian company has constructed one jetliner which has now been thoroughly tested and is ready to construct others when the rush for war planes is over.

American airplane companies are also ready to build jet-propelled passenger airliners as soon as world conditions become more settled and the demand for war planes lessens. While this country as yet has constructed no jetliners, it has the "know-how," having constructed many giant jet-propelled bombers equal in size to transcontinental airliners.

The primary advantage of jet-propelled airliners is speed. Another advantage is passenger comfort due to the freedom of vibrations coming from reciprocating engines. Jet engines are less costly to keep in operating condition than conventional engines, it is claimed. Jetliners would be cheaper to operate than present transports, others claim, because of a saving in feeding passengers and providing other services in the greatly decreased time planes would be en route.

There are those who seem to think that before jetliners come into wide usage in America, planes equipped with the turbo-prop will be used. Transports so equipped would be in what might be called a medium-speed class. They would be faster than the average airliner with reciprocating engines but not as fast as commercial passenger planes powered by jet-propulsion.

Turbo-prop equipment employs a gas turbine engine to provide power to drive conventional bladed propellers. The turbo-prop is even newer than the turbo-jet, which is the type of propulsion used in jet planes. Its first use is said to be in England in 1945. But even in this short period the turbo-prop has established for itself a very definite place in aviation, both in England and in America.

Now the Turbo-Liner

Turbo-liners, transports equipped with the turbo-prop are already called. What is said to be America's first turbo-liner made its first flight in December 1950. The plane was built in California by Consolidated-Vultee and is a version of the 40-passenger standard Convair-Liner. It is powered with two turbo-prop engines developed by the Allison division of General Motors at Indianapolis.

The plane recently completed the longest flight made by an American turbine-powered transport, flying from California to Indianapolis. There it will be used in a research program to determine the suitability of turbo-props in commercial transports.

Turbo-props, it is claimed, would provide all the advantages of turbo-jet propulsion except the extreme speed. Being a rotary, not a reciprocating, type of engine it would impart no vibrations to planes and would provide smooth riding for the comfort of the passengers. It would provide the well-known efficiency of the gas tur-

line to aircraft propulsion. Like all gas turbine engines, it has light weight for the power it delivers.

It is only about one-half as heavy as an ordinary engine delivering the same power. This is important in aviation. It permits a plane to carry a heavier pay-load. Also it permits a plane to carry, without overloading, all the radar and other electronic and safety equipment now demanded in commercial planes that fly in all kinds of weather.

The development of the jet engine in this ten-year age of jet propulsion is perhaps responsible for the development of gas turbine engines used in the turbo-prop because both of these types of propulsion are similar in some respects. Both use a type of gas turbine engine.

In the turbo-jet, part of the high-pressure gases generated in the combustion chamber is used to drive a compressor to provide air for combustion. The rest is discharged to the rear to provide propulsion. In the turbo-prop all the gases generated are driven against vanes on a shaft to cause rotation of the shaft, at one end of which are conventional blades to provide propulsion.

The development of the turbo-prop during this age of jet propulsion may carry over into a wide usage in surface propulsion. Gas turbine engines have been widely used in stationary installations for many years. Now they are in experimental use in vehicles of various types.

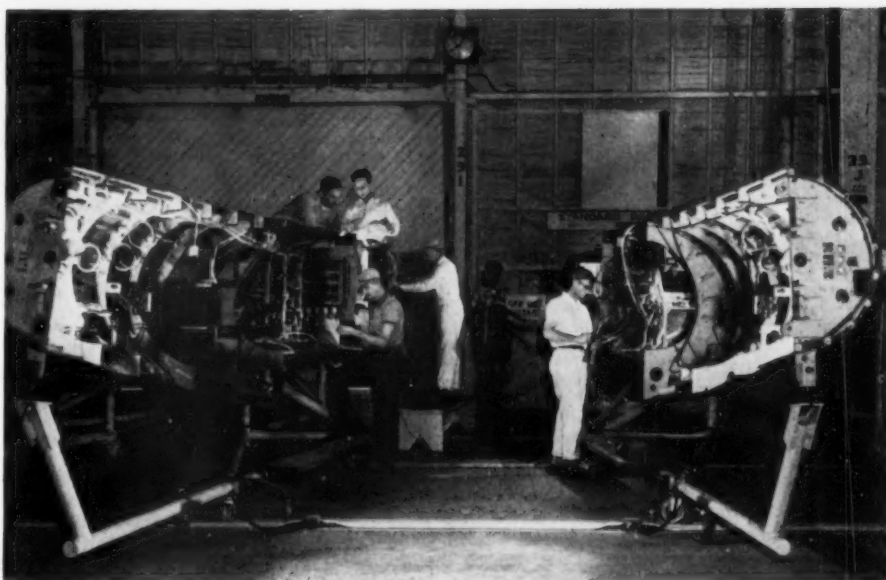
Gas Turbine Locomotive

A gas turbine locomotive was relatively recently put into regular service on an American railroad where it is undergoing severe testing. A coal-burning gas turbine locomotive is under development. It would use for fuel very finely pulverized coal instead of oil. Its development is sponsored by a group of eastern coal-carrying railroads. The objective is a locomotive with the efficiency and economy provided by the gas turbine, which would use America's most abundant fuel and be independent of possible shortages in fuel oil.

The world's first merchant ship powered with a gas turbine engine has recently made a round trip from England, where it was built, to the Caribbean area. Small boats using this type of propulsion are in experimental use by American armed forces. The British vessel is a 12,500-ton tanker with one of its four diesel engines replaced by a gas turbine. The test trip was made using the gas turbine only. Many marine engineers seem to be of the opinion that gas turbines will some day be the preferred power for ocean vessels because of the efficiency and smoothness with which they operate.

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A Scottish-owned research ship, the Calamus, is being equipped with a television apparatus powerful enough to see life on the ocean floor at experimental fish-breeding grounds.



JETS ON THE HALF SHELL—To speed up production of the Scorpion, assemblers work on halves of the fuselage separately, installing plumbing, wiring and other equipment.

PHYSIOLOGY

Dextran Consumed in Body

Burning in body traced with radioactive dextran obtained by fermenting radioactive sugar. Discovery reassures doctors about using it as plasma substitute.

► FAVORITE AMONG blood plasma substitutes today is dextran, the chemical produced by bacterial fermentation of sugar.

Dextran gains this place as a result of new evidence that it is burned in the body like other sugars and starches. This was discovered through studies with radioactive dextran made at the request of the Surgeon General of the Army and under the direction of the subcommittee on shock of the National Research Council.

The fact that dextran is handled in the body and eliminated like carbohydrates makes medical men a little happier about using it. They do not like to inject something into the blood stream which is going to stick around in the body for a long time unless they can be sure it is perfectly safe.

Another of the new plasma expanders, called PVP, short for polyvinylpyrrolidone, is not metabolized in the body, as dextran is, and almost half of the original amount of PVP injected remains in the body. No one knows whether, over a long period, this will or will not be harmful.

Civil Defense authorities are stockpiling PVP for use in case of a national emergency, while the Department of Defense is stockpiling dextran and has cornered the entire supply for this year and most of next year's.

Dextran is not considered an ideal plasma substitute, or expander, because it

does sometimes cause mild reactions. The cause of these is not yet known. The fact that it comes from sugar and is burned in the body and eliminated like sugars does not, however, mean that it gives any appreciable amount of nourishment to the patient.

This and the other plasma expanders, such as PVP and a special gelatin, are valuable in treating shock because they restore the volume of blood circulating through the body, though they do not have the



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oxygen-transporting ability and other vital qualities of whole blood.

The radioactive dextran which shows how the chemical is handled in the body was made by cooperation of scientists at the Argonne National Laboratories, Chicago, and the research and development laboratories of Commercial Solvents Corporation, Terre Haute, Ind. Argonne team scientists were Drs. Norbert J. Scully, John Skok, William Chorney and Ronald Watanabe, and the Commercial Solvents scientists were Drs. Homer E. Staveland, Alfred R. Stanley, J. K. Dale, J. T. Craig, E. B. Hodge and Robert Baldwin.

They made their radioactive dextran by first getting carbohydrate-depleted, cut Canna leaves to photosynthesize in the presence of carbon dioxide made with radioactive carbon. This gave a radioactive sugar because its carbon was carbon 14. From this labelled sugar the dextran was synthesized by fermentation. This process is reported in *Science* (July 25).

Tests of the radioactive dextran on mice, rats, dogs and man were made, and will be reported in detail later, by the following scientists: Dr. J. Garrott Allen, University of Chicago Medical School; Dr. Walter L. Bloom, Emory University Medical School, Atlanta, Ga.; Dr. Leon Hellman, Sloan-Kettering Institute, New York; Drs. Joe Howland and Rodger Terry, University of Rochester, N.Y., School of Medicine and Dentistry; the Surgical Research Unit at Brooke Army Hospital, Fort Sam Houston, Tex.; and Dr. Harry M. Vars, University of Pennsylvania School of Medicine, Philadelphia.

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If you were living on the moon, the skies would appear black even though the sun might be up; there is no appreciable atmosphere there to scatter the blue rays of sunlight.

An ostrich egg weighs about three pounds and equals in volume about a dozen and a half chicken eggs.

Giant hydro-electric plants at Niagara Falls generate almost half the total rated water-power capacity of New York state.



New 1952 Model!
35-mm. EXAKTA "VX"
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One lens both for viewing and picture taking assures perfect sharpness, accurate exposure, maximum depth of field, and correct composition for color. You always see the exact image before you take the picture—whether the subject is an inch or a mile away, whether it is microscopic or gigantic, whether it is moving or stationary. Instantly interchangeable lenses permit telephoto, wide angle, close-up, copy and microscope photography. With f2.8 Zeiss Tessar "T" Coated Lens with Pre-Set Diaphragm Control. . . . \$269.50 tax included

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. books in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

CHILDHOOD EXPERIENCE AND PERSONAL DESTINY: A Psychoanalytic Theory of Neurosis—William V. Silverberg—*Springer*, 289 p., \$4.50. The author believes that a child's experiences before the age of six plant the seeds of whatever mental illness he may later develop.

CONSERVATION IN CANADA—O. M. McConkey—*Dent*, 215 p., illus., \$3.50. Canada, the author points out, is one of the last almost virgin areas of the world and has some of the world's last reserves of raw materials. Here are considered ways to prevent wastage of this wealth.

EDUCATORS GUIDE TO FREE SLIDEFILMS—Mary F. Horkheimer and John W. Difford, Eds.—*Educators Progress Service*, 4th ed., 1952, 172 p., paper, \$4.00. Listing in convenient form 214 sound slidefilms, 357 silent slidefilms and four sets of slides.

ELECTRONICS BUYERS' GUIDE—Keith Henney, Editorial director—*McGraw-Hill*, 558 p., illus., \$2.00. An important reference book for anyone having to do with electronic equipment. A directory of manufacturers of electronic products is included.

AN EXPLAINING AND PRONOUNCING DICTIONARY OF SCIENTIFIC AND TECHNICAL WORDS: 10,000 Scientific and Technical Words in 50 Subjects Explained as to a Person Who Has

Little or No Knowledge of the Particular Subject—W. E. Flood and Michael West—*Longmans, Green*, 397 p., illus., \$2.25. A helpful feature of this handy dictionary is the liberal use of clear drawings to illustrate it.

THE FERN GENUS *DIELLIA*: Its Structure, Affinities and Taxonomy—Warren H. Wagner, Jr.—*University of California Press*, 167 p., illus., paper, \$3.00. This genus is endemic in Hawaii and has served as a textbook example of transition from separate sori to coenosori.

GENERAL EDUCATION BOARD ANNUAL REPORT—Robert D. Calkins, director—*General Education Board*, 83 p., illus., paper, free upon request to publisher, 49 West 49th St., New York 20, N. Y. Telling of the benefits obtained for the money distributed by this institution.

INDIA AND THE PASSING OF EMPIRE—Sir George Dunbar—*Philosophical Library*, 225 p., illus., \$4.75. Recalling the influences of the historical background, the author sets forth his explanation of how modern India developed.

INSTRUMENTS FOR AIR POLLUTION MEASUREMENT—W. C. L. Hemeon—*Mellon Institute*, 4 p., paper, free upon request to publisher, 4400 Fifth Avenue, Pittsburgh 13, Pa.

AN INTRODUCTION TO HISTORICAL GEOLOGY WITH SPECIAL REFERENCE TO NORTH AMERICA—William J. Miller—*Van Nostrand*—6th ed., 555 p., illus., \$5.50. Many new topics have been added to this edition designed for the student who has already had a beginning course in geology.

MEDIEVAL PHILOSOPHY—Frederick C. Copleston—*Philosophical Library*, 194 p., \$2.75. While knowledge of Aristotelian philosophy will aid the reader of this book, terminology has been simplified in this historical approach to medieval philosophy.

NATOB—A NEW BUSH LESPEDEZA FOR SOIL CONSERVATION—Franklin J. Crider—*Govt. Printing Office*, 10 p., illus., paper, 10 cents. Finding of this Natob strain makes it possible to extend the use of Lespedeza bicolor much farther north.

YOUR HAIR

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A medical specialist tells you what to do to save and beautify your hair, stimulate healthier hair growth, and deal with many problems, as: Dandruff—gray hair—thinning hair—care of the scalp—baldness—abnormal types of hair—excessive oiliness—brittle dryness—hair falling out—infection—parasites—hair hygiene—glands—diet—coloring—and myriad other subjects concerning hair.

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Questions

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CHEMISTRY—What is the structure of terramycin? p. 83.

• • •

HERPETOLOGY—Why is the hunter in greater danger from snakes than the oil worker? p. 84.

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PHYSICS—What atmospheric conditions might make people see saucers? p. 82.

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PSYCHOLOGY—What is the advantage of roadside billboards? p. 93.

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NUMERICAL METHODS IN ENGINEERING—Mario G. Salvadori—*Prentice-Hall*, 258 p., illus., \$6.65. The numerical approach is becoming more popular because, with modern calculators, it permits the use of workers with limited mathematical knowledge.

PATHOGENESIS OF CANCER AND APPLIED THERAPY—John E. Gregory—*Bruce Humphries*, 182 p., illus., \$7.50. The author expresses the hope that his research results may stimulate a stronger search for antibiotics that may be useful against cancer.

POLARIZED LIGHT IN METALLOGRAPHY—G. K. T. Conn and F. J. Bradshaw—*Academic Press*, 130 p., illus., \$3.80. On the applications of the microscope in metallurgy with particular attention to microscopic examination using polarized light.

PROBLEMS OF AGING: Transactions of the Fourteenth Conference—Nathan W. Shock, Ed.—*Josiah Macy, Jr., Foundation*, 138 p., illus., \$3.00. At this conference, experts from several different professions met to exchange ideas, experiences, data and methods that would help in solving the problems of old age.

PROPERTIES OF THE PRINCIPAL FATS, FATTY OILS, WAXES, FATTY ACIDS AND THEIR SALTS—M. P. Doss—*Texas Company*, 244 p., \$5.00.

PLANT PATHOLOGY

"Quick Decline" of Dates

► **CALIFORNIA'S UNIQUE** Coachella Valley date industry is threatened with a mysterious "rapid decline" disease.

The date malady, thought to be caused by a virus, has cost Coachella Valley growers about 700 trees in the area around La Quinta and Palm Springs, estimates Dr. Ellis F. Darley, assistant plant pathologist at the University of California Citrus Experiment Station.

The disease can kill a mature date palm in two months from the appearance of the earliest visible symptoms. Some trees, he said, have succumbed in as little as 40 days; others have lasted six to eight months.

First effect, the University of California scientist explained, is dropping of the fruit. Then the center leaf dies and decline and death of the lower leaves follow.

Testing a date palm for evidence of a

Tabulating the properties of a host of materials in this field and listing more than 1,350 literature references.

THE SHOALS OF CAPRICORN—F. D. Ommanney—*Harcourt*, 322 p., illus., \$4.00. A scientist describes his experiences in the Indian Ocean aboard a 45-ton drifter.

A SIMPLE METHOD OF TEMPERING CUTTING TOOLS REQUIRED BY THE APPLIANCE MAKER—John L. Young—*Mellon Institute*, 4 p., illus., paper, free upon request to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa. "Temper color" requires a great deal of skill, but there are other methods to aid in determining when metal has reached the correct drawing temperature.

THE SIPUNCULID WORMS OF CALIFORNIA AND BAJA CALIFORNIA—Walter Kenrick Fisher—*Smithsonian*, 450 p., illus., paper, free upon request to publisher, Washington 25, D. C. These wormlike creatures live in the water from the intertidal zone to oceanic depths.

TRANSLATIONS FROM THE PHILOSOPHICAL WRITINGS OF GOTTLIEB FREGE—Peter Geach and Max Black, Eds.—*Philosophical Library*, 244 p., \$5.75. Making available to English readers these logical essays long buried in inaccessible German periodicals.

Science News Letter, August 9, 1952

virus presents difficulties because it is impossible to bud or graft from one palm tree onto another. However, because most viruses have a carrier, insects found on declined palm trees are being placed on healthy ones to see if the disease follows. And since many viruses have a wide host range, juice from affected trees is being brushed on other plants like tobacco and several vegetables to see if they pick up signs of virus infection.

Science News Letter, August 9, 1952

PSYCHOLOGY

Roadside Billboards May Keep You Alive

► **THOSE ROADSIDE** billboards that irritate many nature lovers may not be so bad after all when spotted along smooth curveless stretches of highway.

Experimenters at the Iowa State College Driving Laboratory, Ames, Iowa, report that easy-to-drive highways having few attention-getters often cause motorists to become less alert. The monotony of driving such a road dulls the senses and slows reflexes. That in turn ups the chances of auto accidents.

Bigger, better and brighter road signs were recommended to offset the effect. Occasional changes in pavement color and different kinds of roadside development also should help keep the motorist "on his toes," the scientists add.

Science News Letter, August 9, 1952

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RADIO

Educational TV Boom

► AN UNEXPECTED boom in the educational television business has produced 12 applications for video stations so far. The Federal Communications Commission has just stamped a big O.K. on four of them.

Educational stations just approved are scheduled to serve Manhattan, Kans., and Albany, Buffalo and Rochester, N. Y.

FCC Commissioner Frieda B. Hennock told SCIENCE SERVICE that other applications for the educational stations have come in from California, Florida and Texas. New York still has five applications pending.

The FCC set aside 242 channels for educational television stations when it opened the ultra high frequency spectrum to television broadcasting last spring.

Miss Hennock said she is "thrilled" so far at the educational television boom. She said the Emerson Radio and Phonograph Corp. helped get the ball rolling when it

offered a \$10,000 grant to the first 10 educational licensees to begin regular operation.

Apparently the boom still is gaining momentum. New York state, trying to forge an educational TV network, has applied for reserved UHF channels to serve Syracuse, Binghamton, Ithaca, Utica and New York City in addition to the ones just approved. Plans for other stations in New York cities currently are in the mill.

The New York educational network will be used by public schools and colleges on a cooperative basis. Programs will originate all over the state and will be relayed to other network stations. Programs to be screened locally also are being planned.

Applications still pending are for stations to serve the San Francisco-Oakland area in California; Miami, Fla., and Houston, Tex.

Science News Letter, August 9, 1952

METEOROLOGY

Automatic Observation

► TEMPERATURE, ATMOSPHERIC pressure and other weather information may be transmitted from an unmanned observation post through use of a new automatic radio weather station which has received a patent.

The meteorological instruments used at the automatic station affect an electrical circuit by varying its resistance as atmospheric conditions change. The readings on the instruments are translated in sequence into a succession of pulses. The time inter-

val between the initiation of the pulses is a measurement of the magnitude of the resistors and, thus, of the corresponding instrument readings.

The pulses emitted by the radio transmitter may then be recorded by a tape recorder in a receiving station.

The inventor is Harold J. McCreary, Lombard, Ill. He received patent number 2,605,343, which was assigned to the Automatic Electric Laboratories, Chicago.

Science News Letter, August 9, 1952

MEDICINE

Give Feet Special Care To Avoid Athlete's Foot

► GIVE YOUR feet special care during hot weather, to avoid getting ringworm of the feet, or athlete's foot as it is popularly called. This advice comes from the Illinois State Medical Society. This painful, itchy disorder gets its popular name because so many cases occur among people frequenting swimming pools, gymnasiums and shower rooms. But it can be picked up from the floor or tub of the bathroom at home if someone in the home has the infection.

The cause of the condition is believed to be infection with fungi, vegetable organisms similar to those causing the mold on stale bread. These organisms thrive on damp, moist areas of the skin and may lie dormant for months and even years. The condition is not confined to the feet, but may appear in any area of the body that is susceptible to moistness, such as the groin,

armpits, the scalp and hands. Thus the medical term for the condition, dermatophytosis, means any skin disease caused by fungi.

In prevention of ringworm of the feet, the medical Society advises careful attention to the areas between the toes, particularly in bathing and drying the feet. In washing, the toes should be separated and cleaned thoroughly but gently. The same procedure should be followed in drying the feet. This is important in all seasons of the year, but particularly during the summer months when humid and excessive heat cause the body to perspire more.

The top cells are constantly being replaced by new cells from the lower layers of the skin. If the dead surface cells are not removed, they, with the moistness natural to the area between the toes, create a field conducive to the growth of fungi.

Once the condition is noted, however, such as a dry scaliness of the skin, or cracks between the toes, a physician should be consulted because the infection can be transferred from one part of the body to another, and from one member of the family to another.

Science News Letter, August 9, 1952

METEOROLOGY

Drought-Stricken South May Expect Relief Now

► HOPE FOR the drought-stricken South appears in the U. S. Weather Bureau's extended forecast for the month of August.

Over the eastern portions of the nation where drought has occurred in many areas, some relief is expected, but total rainfall for the month will not exceed seasonal normals, is the official forecast.

The "eastern portions of the nation" include, Weather Bureau spokesmen said, Georgia, Tennessee and the entire area where an emergency has been declared because of the drought.

It will still be hot even if this area gets rain enough to relieve the drought. The Weather Bureau's outlook is for temperatures averaging above seasonal normals for the western half of the nation and the deep South. Slightly cooler than normal temperatures are expected in the Lakes region and the North Atlantic states. In other areas temperatures not far from normal are indicated.

Subnormal rainfall is predicted for the Great Plains, western Gulf states and the Rocky Mountains, but substantial showers are expected in a belt extending from Arizona north to Oregon. This belt normally is very dry in the summer.

Science News Letter, August 9, 1952

Rare earth elements make up an appreciable fraction of the fission products of atomic piles.

Gum arabic, used as an adhesive agent in pills, candy and other dietary products, is at present imported from the Middle East.

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RADAR WARNING — From the round reflector in the window, a beam of short radio waves is aimed down the road. The approaching automobile sends back an echo that causes a warning bell to ring inside the guard house, calling the attention of the guard to the arrival of a visitor or intruder.

ELECTRONICS

Radar Warns Guard Of Nearby Persons

► RADAR CAN be made to spot human beings now as well as cars, airplanes and "flying saucers."

A radar-like device that will warn guards of approaching pedestrians, trucks and cars nearing the main entrance of General Electric's Research Laboratory has been installed to help maintain security at night and on week ends.

Persons can be detected walking toward the machine at 100 feet. An automobile reflects a tell-tale signal while still several hundred feet away. Big flat-walled trailer trucks ring the warning bell at an even greater distance.

Called an "electronic cop," the device works on the principles of the proximity fuse. It sends out a continuous radio signal that is reflected back by nearby objects. When the object is moving, the reflected signal goes in and out of phase with the transmitted signal, causing a bell to ring. If the object is not moving, the bell does not ring.

Developed by William C. White, C. Luther Andrews and Hiram S. Lasher, all of the G.E. Research Laboratory, the device sends out radio waves that are only five inches long and that behave much like light waves.

The scientists say the device's range can be extended by substituting a larger radio-wave reflector used to focus the radio beam. The present reflector is an 18-inch parabolic

• RADIO

Saturday, August 16, 1952, 3:15-3:30 p.m., EDT
"Adventures in Science," with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Walter G. Vincenti, aeronautical research scientist of the Ames Aeronautical Laboratory, National Advisory Committee for Aeronautics, discusses "Research for Future Flying."

aluminum dish-like affair. With a larger reflector, automobiles could be picked up while still 600 feet away.

Science News Letter, August 9, 1952

METALLURGY

Plating Sticks to Oxide-Coated Metals

► METAL PLATING and solder stick better to oxide-coated metals and glass by improved methods using evaporation techniques revealed now by the Army Engineer Research and Development Laboratories. Excellent adhesion to the oxide coatings that form in ordinary temperatures on aluminum, chromium and titanium can now be made.

Some metals are difficult to electroplate or solder due to poor adhesion to their natural hard tenacious oxide coatings. Research was to find methods to secure adhesion to such metals by a process that includes their oxides. Evaporated films of most metals that form hard adherent oxide coatings can be caused to adhere tenaciously to their own and other oxides, scientists state.

Evaporated films of some metals such as gold, silver and copper, show poor adhesion to oxides. However, a metal of the latter group can be made to adhere to a metal of the former group, aluminum, chromium and titanium, by high vacuum techniques.

The vapors of the two metals are deposited at the same time in such a manner as to eliminate the oxide coating which hinders adhesion. Thus, to coat titanium with copper, titanium is first evaporated on the oxide-coated titanium. At the first evidence of titanium deposition, the evaporation of copper is begun. At the first copper deposit, the titanium source is turned off and the copper evaporation continued until no titanium shows through the surface. The resulting surface can be soldered to directly or can be built up by electroplating.

Science News Letter, August 9, 1952

Grass silage, in everyday farm language, is silage made from any of the green crops which might otherwise be dried and made into hay.

The biggest bats in the world, popularly called *flying foxes*, are found in the Old World tropics; they have about a five-foot wingspread.

Do You Know?

A new cooling device can change a blast of air at 600 degrees into *snow* within 2/10 of a second.

Hot, humid weather is conducive to a rapid life cycle of intestinal *parasites* of poultry.

Over 1,100 workers in *uranium* mines and mills of Colorado, Utah, New Mexico and Arizona show no evidences of health damage from radioactivity.

North America's most dangerous forest insect is the *spruce budworm*.

A gram of *gold* can be beaten into a leaf 0.0000033 inch thick that will cover six square feet.

Fresh strawberries are a good source of *vitamin C*.

Levulose, the sugar found in honey, is the sweetest of *sugars*; next in order are sucrose and dextrose.

Coffee is grown commercially in lands lying in a belt around the globe about 22 degrees north and south of the Equator.

About 55% of the United States' population is being served by 109 *TV stations* now on the air.

Americans get twice as much mileage out of their *shoes* today than they did 50 years ago, leather manufacturers say.

Oyster drills are worm-like creatures 1/15 to 3/4 of an inch long; the file of an oyster drill is a flexible ribbon about two inches long equipped with three rows of teeth capable of sawing into oyster shells.

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• New Machines and Gadgets •

For addresses where you can get more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C., and ask for Gadget Bulletin 634. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

❁ **RUST INHIBITOR**, a magnesium alloy, is mounted under an automobile radiator cap to protect the water-cooling system from rusting. The device corrodes away in from six months to a year's time, depositing at the same time a metallic corrosion-resistant and heat-conducting film throughout the cooling system.

Science News Letter, August 9, 1952

❁ **LIGHT SUPPORT** for amateur movie makers holds two reflector-flood or reflector-spot lamps on adjustable arms that can be folded out of the way when not in use. Equipped with a 10-foot cord and individual light switches, the support fits any movie or still camera having a standard tripod socket.

Science News Letter, August 9, 1952

❁ **"COLD GALVANIZING"** compound for home use protects the surfaces of drain pipes, casement windows, fenders and other metals subject to rust. The compound dries within 48 hours and should be coated with an oil-base paint for complete protection from rust.

Science News Letter, August 9, 1952

❁ **FLUORESCENT MERCURY** lamp for large industrial areas produces "golden white" light when ultraviolet rays gener-



ated in the mercury tube strike an outer glass envelope covered with red-glowing phosphors. Made in 1,000- and 400-watt sizes, the lamp has high efficiency and is suitable where close color discrimination is not required.

Science News Letter, August 9, 1952

❁ **RECORD PLAYER** is especially good in music shops where rough handling of phonograph equipment causes damage.

Except for putting the record on the turntable, the player is completely automatic, working from pushbuttons. Built-in protection prevents listeners from touching the tone arm.

Science News Letter, August 9, 1952

❁ **PRACTICE GOLF** ball made of a cellular plastic weighs only 1/13 as much as a standard ball and travels about 100 feet with "good drives." Resembling a real golf ball in size, color and appearance, the practice ball responds to slices, hooks and faulty swings just as standard balls, thus helping the golfer improve his game with less walking.

Science News Letter, August 9, 1952

❁ **GLOSS COATING** liquid protects automobile finishes and chrome trim from blazing, tropical sunlight, or from thick, city smog. Easily applied, the liquid is spread over the surface and lightly wiped into brilliance with a dry cloth.

Science News Letter, August 9, 1952

❁ **CLOTHESLINE PULLEY** has extra wide lips and is attached to a pole or other object by a device that allows clothes to be pulled right around the pulley, thus doubling pulley-line capacity.

Science News Letter, August 9, 1952

• Nature Ramblings •

➤ **FREQUENTLY** WE hear of a person living on the farm or in the woods who has "tamed" some wild animal not usually kept as a pet, like a porcupine, or a groundhog, or a skunk, or even a toad.

We may also hear of animals in a given locality being so "tame" that one can walk right up to them. Both of these uses of the word are somewhat inaccurate. Ordinarily timorous or cautious animals, like deer or beaver, that let you approach them should properly be called fearless. Actually such fearlessness is the normal attitude of animals toward man unless he has given them cause to regard him as a predator, and in the same class with wolves and wildcats.

The person with a "tame" wild animal as a rule gets no further than having offerings of food accepted, or perhaps being permitted to stroke its fur or scratch its ears. This degree of intimacy is tolerated, and even apparently enjoyed, by a great variety of animals, which otherwise live their normal wilderness lives. Naturalists refer to such animals as "familiar."

Tame or Familiar?



A step toward real tameness comes if the animal consents to share quarters with its human friend. That is an approach to what zoologists call commensalism, which merely means living in the same house. As a matter of fact, some of our supposedly domesticated animals, cats for example, though housemates of man for scores of generations, are really no tamer than that. They accept our food, affection and shelter, and give us nothing in return but their pleasant company. The same can be done with

prairie-dog or armadillo, starting from scratch.

An animal may be regarded as fully tamed when it makes some tangible return to its human partner for the favors it receives, such as helping in hunting, or guarding property, or bearing burdens. Dogs illustrate this behavior phase very well, and so do horses. Some cats approach this level but they are exceptional individuals.

Wild animals can be fully and satisfactorily tamed. Wild horses, after proper handling, become good saddle and draft animals. Wild elephants are constantly being rounded up in the Asiatic tropics, and live long lives of service to man. Hawks and cheetahs, the very symbols of fierce independence, are captured and tamed into excellent hunting servants.

There is thus no question of the tamability of wild animals; only, before we call an animal tame, we should assure ourselves that its behavior toward man qualifies it for that title.

Science News Letter, August 9, 1952